UCRL-CR-111746 Rev. 1
Addendum #5

Environmental Protection Department
Hazardous Waste Management Division

Application to Ship Low-Level Radioactive Waste to the Nevada Test Site

Addendum #5
Encapsulated Uranium Turnings

February 1995

Lawrence Livermore National Laboratory
University of California Livermore, California 94551

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UCRL-CR-111746 Rev. 1

Application to Ship Low-Level Radioactive Waste to the Nevada Test Site

Addendum #5

Encapsulated Uranium Turnings

PUBLICATION RECORD

Revision No.	Title of Published Document	Effective Date	Change
0	Addendum #5	2/95	Addition of new waste stream

DEPARTMENT OF ENERGY APPROVAL SIGNATURE

The signature below attests that the information within this addendum is correct and that the waste streams to be shipped shall meet the U.S. Department of Energy (DOE), Nevada Operations Office (NV), NVO-325 (Rev. 1) "Nevada Test Site Defense Waste Acceptance Criteria, Certification, and Transfer Requirements."

Accepted By:

_____

Roy Kearns — Date
Program Manager, Waste Management Division
Oakland Operations Office, DOE/OAK

APPROVAL SIGNATURES

The signatures below attest that the information within this addendum is correct and that the waste streams to be shipped shall meet the U.S. Department of Energy (DOE), Nevada Operations Office (NV), NVO-325 (Rev. 1) "Nevada Test Site Defense Waste Acceptance Criteria, Certification, and Transfer Requirements."

Approved for use:

Dennis Fisher — Date
Associate Director for Plant Operations

Issued:

Robert Fischer — Date
Waste Certification Official

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John Palmer — Date
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*The section numbering in this Addendum continues from the Application. Numbering of figures continues from Addendum #4.

II. WASTE CHARACTERIZATION PROGRAM

A. Process Knowledge Program

This waste stream will be characterized through both process knowledge and sampling and analysis. Waste characterization data applicable to this waste stream will be summarized and organized in accordance with WCP Implementing Procedure No. 15. In addition, a process knowledge evaluation will be conducted on the processes that generated the waste. Results of the evaluation will be documented on a Process Knowledge Evaluation Form in accordance with the requirements outlined in WCP Implementing Procedure No.14.

Information available to support characterization by process knowledge includes a contractor report prepared for LLNL, “Depleted Uranium Waste Characterization and Treatment.” This report summarizes random sampling conducted by the contractor on the subject waste stream and indicates that the liquid oxidation inhibitor under which the waste is packaged contains trace organic and metal contamination that may exceed regulatory levels. LLNL will remove the liquid fraction and manage it as a separate waste stream. The liquid oxidation inhibitor will not be shipped to the NTS. The liquid will be replaced by a new inerting material (i.e., mineral oil, sand) to prevent oxidation of the uranium during transport to the contractor for processing.

The quantity of radioactive material present will be determined by weighing the metal prior to encapsulation. Available process knowledge indicates that 99 percent of the material is depleted uranium, with the remainder being natural uranium and natural thorium. The waste containing the natural thorium will be segregated and weighed separately to determine radionuclide concentration. This methodology is supported by gamma spectroscopy analysis on a representative number of drums.

B. Sampling Plan

This waste stream will be sampled in accordance with the “Sampling and Analysis Plan for Encapsulated Uranium Turnings,” UCRL-AR-119764. LLNL plans to obtain samples from the final waste form to demonstrate compliance with NVO-325 (Rev. 1).

C. Waste Sampling and Analysis Requirements

Analytical methods specified in the EPA document SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA 1986), and other standard references will be utilized for sample analysis to determine the presence of regulated hazardous constituents.

Analytical parameters were selected in accordance with the requirements of NVO-325 (Rev 1). The respective analytical methods used are presented in the “Sampling and Analysis Plan for Encapsulated Uranium Turnings,” UCRL-AR-119764.

D. Standardized Data Reporting Forms

The standardized data reporting required by the NVO-325 LRD (Rev. 1), "Nevada Test Site Defense Waste Acceptance Criteria, Certification, and Transfer Requirements Laboratory Reference Document," will be used to report all data associated with the LLNL LLW program.

III. WASTE STREAM INFORMATION

This Addendum #5 proposes to ship low-level radioactive waste to the Nevada Test Site (NTS) from the following waste streams generated by LLNL:

AD*.	Encapsulated Uranium Turnings	BCLA-HWMEU0006

* This continues from the Application.

AD. Encapsulated Uranium Turnings

1. Waste Stream Identification Number: BCLA-HWMEU0006

2. Waste Type: Low-Level Waste

3. Waste Stream Description: This waste stream consists of machine turnings and grinding swarf which are predominantly depleted uranium (DU) and includes small quantities of natural uranium and natural thorium. Sand may also be included, if used as an oxidation inhibitor. Treatment comprises size reduction of the turnings (by ring milling), followed by encapsulation in Portland cement, which is cast in split-form cylindrical molds. The final waste form is a monolithic solid that is chemically inert and contains no free liquids.

4. Waste Certification Flow Diagram: See Figure 91

5. Waste Acceptance Criteria:

   a. General Waste Form Criteria

      (1) Transuranics: LLW must have a transuranic nuclide concentration less than 100 nCi/g. The mass of the waste container including shielding shall not be used in calculating the specific activity of the waste in accordance with NVO-325 (Rev.1), Section 5.5.1.1.A.

      Compliance Method: Gamma spectroscopy analysis of the drummed turnings confirms process knowledge that they are depleted uranium. No detectable transuranics are present. Reference: Final Report, Depleted Uranium Waste Characterization and Treatment; NFT, Inc.; Contract No. B108480; Sept. 11, 1990.

      (2) Hazardous Waste Components: LLW offered for disposal at NTS waste management sites shall not exhibit any characteristics of, or be listed as, hazardous waste as identified in Title 40 CFR 261,"Identification and Listing of Hazardous Waste" or California Code of Regulations, Title 22, Division 4.5, Chapter 11, Section 66261. (NVO-325 (Rev.1), Section 5.5.1.1.B)

      Compliance Method: Liquid associated with the stored depleted uranium turnings (water-based coolant emulsion) will be drained off prior to processing and will not be shipped to NTS. Each drum of depleted uranium turnings will be sampled and analyzed by TCLP. Only those drums confirmed not to be hazardous waste per Title 40 CFR 261 or CCR Title 22, Division 4.5, Chapter 11, Section 66261, will be released for encapsulation processing. The final waste form will be sampled in accordance with the “Sampling and Analysis Plan for Encapsulated Uranium Turnings,” UCRL-AR-119764.

      (3) Free Liquids: Free liquids are liquids that readily separate from the solid portion of a waste under ambient temperature and pressure conditions. (NVO-325 (Rev. 1), Section 5.5.1.1.C)

      Compliance Method: After curing, monolithic concrete slugs are removed from molds, suspended, and subjected to a 100% visual surface inspection. Any free liquid (water) is retained on the mold base.

      (4) Particulates: Fine particulate wastes shall be immobilized so that the waste package contains no more than one weight percent of less-than-10-µm-diameter particles, or 15 weight percent of less-than-200-µm-diameter particles. Waste that is known to be in a particulate form or in a form that could mechanically or chemically be transformed to a particulate during handling and interim storage shall be immobilized. (NVO 325 (Rev.1),Section 5.5.1.1.D)

AD. Encapsulated Uranium Turnings

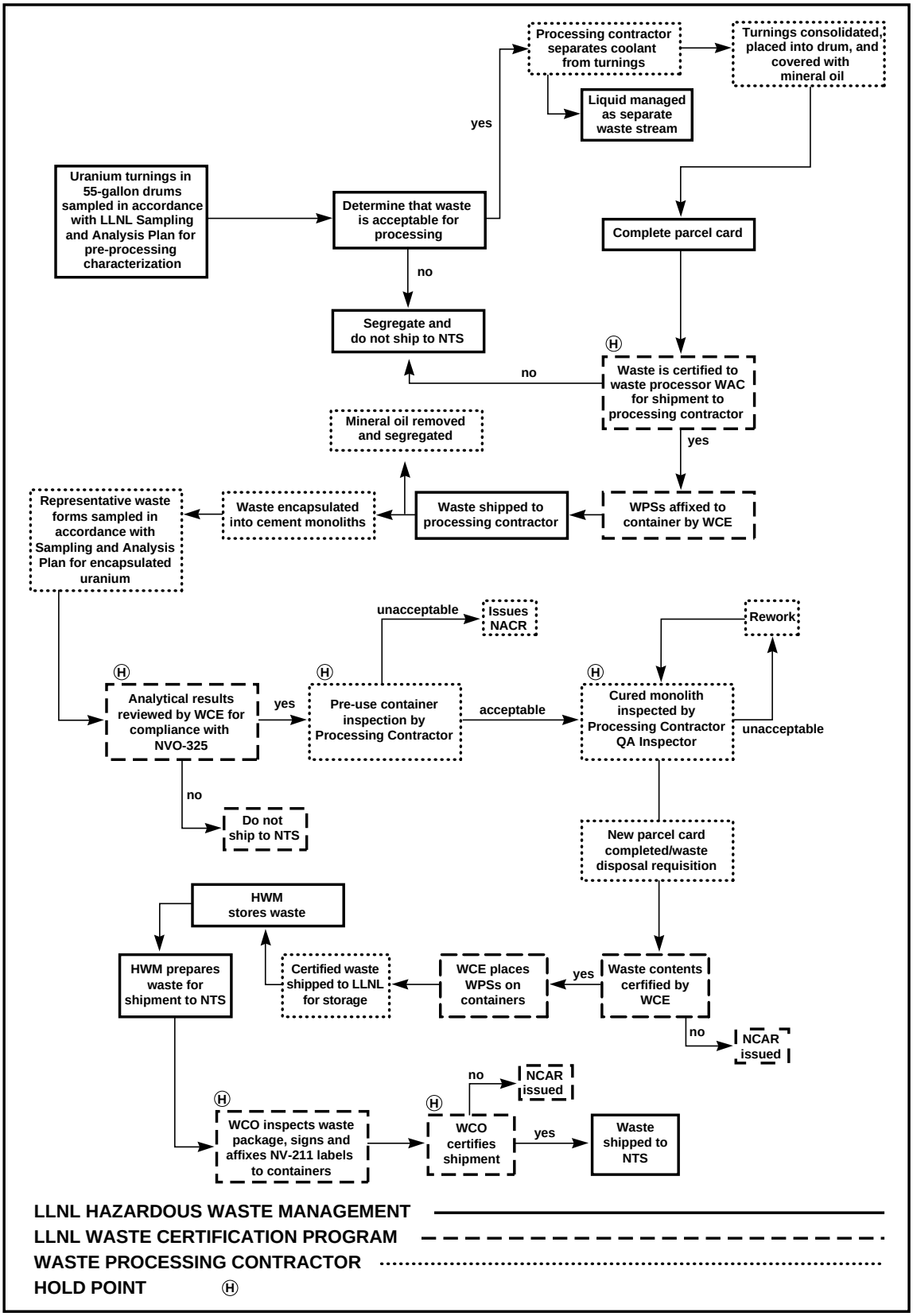


Figure 91. Waste Certification Flow Diagram - BCLA-HWMEU0006

Compliance Method: Any fine particulates originally present in the turnings are immobilized by entrainment in the concrete matrix during mixing.

(5) *Gases: LLW gases shall be stabilized or absorbed so that pressure in the waste package does not exceed 1.5 atmospheres at 20°C. Compressed gases as defined by Title 49 CFR 173.300, including unpunctured aerosol cans, will not be accepted for storage or disposal. Aerosol cans will have puncture disfigurements recognizable by Real-Time Radiography (RTR). Expended gas cylinders must have the valve mechanism removed. (NVO-325 (Rev.1), Section 5.5.1.1.E)*

Compliance Method: Process knowledge confirms that compressed gas as defined by Title 49 CFR 173.300, including unpunctured aerosol cans, is not present in the depleted uranium turnings in their current storage packaging. Should any undetected aerosol cans be concealed in the turnings, they would be shredded and rendered inert and recognizable by RTR during the pre-encapsulation ring milling procedure.

(6) *Stabilization: Where practical, waste shall be treated to reduce volume, promote waste minimization, and provide a more structurally and chemically stable waste form. (NV0-325 (Rev. 1), Section 5.5.1.1. F)*

Compliance Method: The cement encapsulation process, by design, produces a strong, monolithic structure. The amount of depleted uranium turnings per casting (weight loading) is determined, based on process knowledge, so as to minimize final waste volume consistent with the inerting guidance of Title 49 CFR 173.418 (a)(4)(i).

(7) *Etiologic Agents: LLW containing pathogens, infectious wastes, or other etiologic agents as defined in Title 49 CFR 173.386 will not be accepted for disposal at NTS. (NVO-325 (Rev.1), Section 5.5.1.1. G)*

Compliance Method: Not applicable - there were no etiologic agents used in the depleted uranium areas that generated the depleted uranium turnings.

(8) *Chelating Agents: LLW containing chelating or complexing agents at concentrations greater than one percent by weight of the waste form will not be accepted. (NVO-325 (Rev. 1), Section 5.5.1.1 H)*

Compliance Method: As determined by process knowledge, chelating and complexing agents are not present in the depleted uranium turnings. No chelating or complexing agents will be added during the encapsulation process as defined by approved procedures.

(9) *Polychlorinated Biphenyls (PCBs): PCB-contaminated LLW will not be accepted for disposal at NTS unless the PCB concentration meets municipal solid waste disposal levels of 50 ppm or less. See Title 40 CFR 761.60 for PCB disposal requirements. (NVO-325 (Rev.1), Section 5.5.1.1.1I)*

Compliance Method: Process knowledge confirms that the stored depleted uranium turnings do not contain levels of PCBs in excess of 5 ppm. No PCBs will be added during the encapsulation process as defined by approved procedures. The "Sampling and Anaysis Plan for Encapsulated Uranium Turnings," UCRL-AR-119764, will confirm that PCBs are below regulatory limits (5 ppm).

(10) *Explosives and Pyrophorics:LLW containing explosive and/ or pyrophoric material, in a form that may spontaneously explode or combust if the container is breached, will not be accepted. (NVO-325 (Rev.1), Section 5.5.1.1.J)*

Compliance Method: Approved procedures for cement encapsulation produce, by design, a waste form that renders the pyrophoric turnings inert and safe for handling and shipment as prescribed by Title 49 CFR 173.418 (a)(4)(i). This waste does not contain explosives.

b. General Regulatory Waste Package Criteria

(1) Design: Type A packaging shall be designed to meet Title 49 CFR 173.411,"General Design Requirements," and Title 49 CFR 173.412, "Additional Design Requirements for Type A Packages." Type A packages must have been evaluated under the DOE Type A Package Certification Program (see MLM-3245, "DOT 7A Type A Certification Document," or succeeding DOE publication). Type B packaging must meet the applicable requirements of Title 10 CFR 71. Strong, tight packaging used for shipping limited quantities and low specific activity LLW excepted by Titles 49 CFR 173.421 and 173.425, respectively, must be constructed so that it will not leak during normal transportation and handling conditions. (NVO-325 (Rev. 1), Section 5.5.1.2.A)

Compliance Method: Type A packaging that meets the requirements of Title 49 CFR 173.411 and 173.412 will be used. Packaging shall also meet the requirements of 173.418. Type A drums will also be evaluated under the DOE Type A Package Certification Program.

(2) Nuclear Safety: The quantity of fissile radioactive materials shall be limited so that an infinite array of such packages will remain subcritical. This quantity shall be determined on the basis of a specific nuclear safety analysis, considering credible accident situations, and taking into account the actual materials in the waste. See Title 49 CFR 173.451, "Fissile Materials - General Requirements." (NVO-325 (Rev.1), Section 5.5.1.2.B)

Compliance Method: This waste stream consists primarily of depleted uranium. Criticality concerns, therefore, do not apply.

(3) Nuclear Heating: The quantity of radioactive materials shall be limited for each waste matrix and package type so that the effects of nuclear decay heat will not adversely affect the physical or chemical stability of the contents or package integrity. See Title 49 CFR 173.442, "Thermal Limitations," for temperature limits of accessible external package surfaces. (NVO-325 (Rev.1), Section 5.5.1.2.C)

Compliance Method: Levels of activity associated with this waste stream are limited; therefore, the effects of nuclear decay heat will not adversely affect the physical or chemical stability of the contents or the integrity of the package. A 55-gallon drum with a maximum loading of 261 kg (700 lb) of depleted uranium turnings (448 kg [1,200 lb] gross weight) would contain less than 0.12 Ci.

(4) Radiation Levels: The external radiation levels for packages shall not exceed 200 millirems per hour on contact during handling, shipment, and disposal unless specifically excepted by DOT regulations. See Title 49 CFR 173.441, "Radiation Level Limitations." Type B containers that will be unloaded by remote procedures will be addressed on a case-by-case basis. (NV0-325 (Rev.1), Section 5.5.1.2.D)

Compliance Method: Packages will be surveyed externally for radiation levels in accordance with Title 49 CFR 173.441. External radiation levels for containers shall not exceed 200 millirems per hour on contact. Based on process knowledge, actual dose rate levels are expected to be well below a tenth of this limit. LLNL radiation surveys will be performed in accordance with standard operationg procedures (SOPs) HWM 303 and HWM 304.

(5) *External Contamination: Packages shall be within DOT contamination limits upon receipt at NTS. See Title 49 CRF 173.443,"Contamination Control." (NVO-325 (Rev.1), Section 5.5.1.2.E)*

Compliance Method: Packages will be surveyed for nonfixed (removable) radioactive contamination on each waste container surface to ensure levels are in accordance with Title 49 CFR 173.443. 4Q. LLNL radiation surveys will be performed in accordance with Procedures HWM 303 and HWM 304.

(6) *Activity Limits: The activity limits listed in Title 49 CFR 173.431, "Activity Limits for Type A and Type B Packages." shall be met. Where applicable, the activity limits of Titles 49 CFR 173.421, "Limited Quantities of Radioactive Materials," and 49 CFR 173.425, "Transport Requirements for Low-Specific Activity Radioactive Materials," shall be met for strong, tight packages. See NVO-325 (Rev.1), Section 5.5.5.2 for additional requirements for activity limits outside of this range. (NVO-325 (Rev.1), Section 5.5.1.2.F)*

Compliance Method: Activity limits will be met. "A_1"and "A_2" values for depleted uranium, natural uranium, and natural thorium are all "unlimited." Refer to Procedures HWM 303 and HWM 304.

(7) *Multiple Hazards: Waste containing multiple hazards shall be packaged according to the level of hazards as defined in Title 49 CFR 49 173.2,"Classification of Material Having More than One Hazard." (NVO-325 (Rev.1), Section 5.5.1.2.G)*

Compliance Method: Drums containing encapsulated depleted uranium turnings have been rendered inert by being processed according to approved procedures meet the packaging requirements of Title 49 CFR 173.418 (a)(4) for pyrophoric radioactive material.

c. NTS Specific Package Criteria

(1) *Closure: The package closure shall be sturdy enough that it will not be breached under normal handling conditions and will not serve as a weak point for package failure. (NVO-325 Rev,1), Section 5.5.1.3.A)*

Compliance Method: Each package shall be closed and sealed to prevent leakage during normal handling. Closures will not serve as a weak point for package failure. Refer to Procedure WCP-9.

(2) *Strength: Except for bulk waste, waste packaged in steel drums, or SEALAND containers, the waste package (packaging and contents) shall be capable of supporting a uniformly distributed load of 19,528 kg/m^2 (4,000 lbs/ft^2). This is required to support other waste packages and earth cover without crushing during stacking and covering operations. (NVO)-325 (Rev.1), Section 5.5.1.3.B)*

Compliance Method: Encapsulated depleted uranium turnings will be packaged in 55-gallon steel drums. In addition, the monolithic concrete waste forms have been shown to possess a compressive strength far in excess of 50 psi (7,200 lbs/ft^2). The LLNL onsite Hazardous Materials Packaging and Transportation Safety Manual details the responsibilites for container specifications.

(3) *Handling: All waste packages shall be provided with permanently attached skids, cleats, offsets, rings, handles, or other auxiliary lifting devices to allow handling by means of forklifts, cranes, or similar handling equipment. Lifting rings and other auxiliary lifting devices on the package are permissible, hinged in a manner that does not inhibit stacking the packages. The lifting devices must be designed to a 5:1 safety factor based on the ultimate strength of the material. All rigging devices that*

are not permanently attached to the waste package must have a current load test based on 125 percent of the safe working load. (NVO-325 (Rev.1) Section 5.5.1.3.C)

Compliance Method: Steel 55-gallon drums will be used as packaging.

(4) *Size: 1.2 x 1.2 x 2.1 m (4 x 4 x 7 ft) or 1.2 x 0.6 x 2.1 m (4 x 2 x 7 ft) (width, height, length) boxes or 208-liter (55-gallon) drums are required to be used. Bulk waste container approval is discussed in NVO-325 (Rev.1), Section 5.5.4. While these sizes allow optimum stacking efficiency in disposal cells, other dimensions are acceptable with approval from DOE/NV on a case-by-case basis. (NVO-325 (Rev.1), Section 5.5.1.3.D)*

Compliance Method: Encapsulated depleted uranium turnings will be packaged for shipment to NTS in 55-gallon steel drums.

(5) *Weight: In addition to the weight limits set for specific packaging designs, NTS imposes limits of 4,082 kg (9,000 pounds) per box and 544 kg (1,200 pounds) per 208-liter (55-gallon) drum. Packages exceeding 4,082 kg (9,000 pounds) require crane or large forklift removal and must be approved by the REECo Waste Management Department (WMD) prior to shipment. Shipments of this type must be in a removable-top or removable-side trailer. (NVO-325 (Rev.1), Section 5.5.1.3.E)*

Compliance Method: The proportioning of depleted uranium turnings to the concrete encapsulation medium is calculated to produce a final 55-gallon drum waste package that does not exceed a gross weight of 544 kg (1,200 lb) or designated payload of the container. Loaded drums are weighed prior to shipment to confirm compliance. Approval for containers exceeding the weight limits stated above will be secured from, and prior notification of shipment will be given to, REECo so that special handling arrangements can be made. Refer to Procedure HWM 303.

(6) *Loading: The waste package shall be loaded to ensure that the interior volume is as efficiently and compactly loaded as practical. High-density loading will allow efficient RWMS space utilization and provide a more stable waste form that will reduce subsidence and enhance the long-term performance of the disposal site. (NVO-325 (Rev.1) Section 5.5.1.3.F)*

Compliance Method: The proportion of depleted uranium turnings to the concrete encapsulation medium is controlled to maximize waste loadings while insuring that the effectiveness and safety of the inerting objective is maintained.

(7) *Nonstandard Type A Packaging: Use of DOT Type A Packages not previously evaluated under the DOE Type A Packaging Certification Program (see MLM-3245, etc.) will not be permitted. (NVO-325 (Rev.1), Section 5.5.1.3.G)*

Compliance Method: Nonstandard Type A Packaging will not be used for LLW disposal. Packaging shall meet NVO-325 criteria.

(8) *Package Protection: The generator shall take the following precautions to protect the waste package after closure.*

(a) *The preshipment storage environment shall be controlled to avoid adverse influence from weather or other factors on the containment capability of the waste packaging during handling, storage, and transport. The generator preparing waste for preshipment storage shall take all reasonable precautions to preclude the accumulation of moisture on or in packages prior to their arrival at the NTS.*

(b) A form of Tamper Indicating Device (TID) shall be applied to each waste container once certification actions have been completed.

(c) Each waste package shall be prepared for shipment so as to minimize damage during transit. Minor damage incurred during transit, not attributable to poor packaging, will be repaired at the RWMS without charge to the waste generator. Costs for repairs of damage caused by waste generator or carrier negligence as well as any necessary decontamination to meet DOE Order 5480.11 will be charged to the waste generator. (NVO-325 (Rev.1), Section 5.5.1.3.H)

Compliance Method: Drums containing encapsulated depleted uranium turnings will be stored under overhead cover or loaded directly into a closed trailer for shipment (no outside storage allowed). Ring bolt closures of certified drums will be sealed with TIDs. Drums will be blocked and braced to prevent displacement and damage during shipping. Refer to Procedures WCP-9, HWM 303 and HWM 304.

(9) Marking and Labeling: Each waste package shall have the following information:

(a) Marking and labeling as required in Title 49 CFR 172, Subparts D and E.

(b) Signed NV-211, "Packaging Certification" label (revision date January 27, 1989) (see Figure 8, page 76 of the NVO-325 (Rev.1)). If the waste is unpackaged bulk, a signed NV-211 label must accompany the shipment papers. These labels can be obtained from REECo/WMD.

(c) Shipment number in the following sequence: Two alpha-character generator site designator code assigned by REECo/WMD (see Appendix D in the NVO-325 [Rev. 1]); one alpha-character for type of waste - L for LLW, M for MW, T for TRU, or X for TRUMW; two numeric characters for current fiscal year; three numeric characters for shipment sequence. Example MDL93001 would mean a shipment from EG&G Mound of low-level waste in fiscal year 1993 and the first shipment.

(d) Package number shall be six characters (alpha, numeric, or combination) with no duplication within that shipment.

(e) Approved 13-digit waste stream identification number (see Section 5.1 in the NVO-325 (Rev.1).

(f) Package weight in units of pounds and kilograms. (NVO-325 (Rev.1), Section 5.5.1.3.I)

Compliance Method:

(a) All waste packages will be labeled and marked in accordance with 49 CFR 172, subparts D and E. Examples of how containers are to be labeled are “RADIOACTIVE (YELLOW-II)” and “SPONTANEOUSLY COMBUSTIBLE,” and of how they are to be marked are “TYPE A, URANIUM METAL PYROPHORIC, UN2979,” and “(RADIONUCLIDES) R.Q.”

(b) An NV-211, "Packaging Certification" label will be completed and signed by the LLNL Waste Certification Officials or Waste Certification Engineer and affixed to each container. Refer to Procedure WCP-10.

(c) The shipment number shall consist of eight characters. The first two characters will be "L" and "L" (assigned by REECo/WMD); the third character will be "L" for low-level waste; the fourth and fifth characters will represent the fiscal year (e.g. 95); and the last three characters will be the shipment

number, consecutively numbered from the first shipment made by LLNL to the NTS each fiscal year. Example: LLL95001. Refer to Procedures HWM 303 and 304.

(d) The package number shall be six numerical characters with no duplication within a shipment. See Procedures HWM 303 and 304.

(e) The waste stream identification number shall be 13 characters in length. The first four characters will be the DOE-assigned WMIS generator code and the remaining nine characters are the generator-assigned waste stream code. Example: BCLA-HWMEU0006. Refer to Procedure HWM 303.

(f) The package weight will be marked on the container in both pounds and kilograms in characters at least one-half inch in height. Refer to Procedures HWM 303 and 304.

(10) Barcoding: The shipment, package, and waste stream identification numbers shall be barcoded according to the following standards:

(a) Code 39.

(b) Medium to high density, high density preferred.

(c) 1.0" high barcode.

(d) Human readable interpretation (HRI) 0.50" high printed below the barcode.

(e) Spacing between barcode and HRI will be 0.10".

(f) Minimum left and right margin (quiet zones) will be least 0.25".

(g) All barcodes and HRI will be stacked with a minimum separation of 0.50" and in the following order: shipment number, container number, and waste stream identification number.

(h) A total of two barcode labels shall be placed on each box or nonstandard package near the top and on opposite sides. Drums will have a total of two barcode labels, one on top of the drum lid and one on the side near the top.

(i) A sample barcode must be submitted to REECo/WMD prior to the first shipment to ensure that REECo/WMD equipment can be used to read the barcode. (NVO-325 (Rev.1), Section 5.5.1.3.J)

Compliance Method: LLNL barcoding will comply with DOE/NV requirements and meet the followng requirements:

(a) Code 39.

(b) Medium density.

(c) Barcode will be 1.0" high.

(d) Human readable interpretation (HRI) 0.50" high will be printed below the barcode.

(e) Spacing between barcodes and HRI will be 0.10".

(f) Left and right margins will be at least 0.25".

(g) Barcodes and HRI will be stacked with a minimum separation of 0.50" in the following order:

- shipment number
- container number
- waste stream identification number

(h). For each drum, a barcode label will be placed on the top of the drum lid and one on the side near the top. Procedures for applying barcodes are found in HWM 303 and 304.

(i) A sample barcode has been submitted to, and approved by, REECo/WMD.

(11) Onsite Transfer: Onsite transfer must be in accordance with NV 54XG.1A, "NV Radiological Safety Manual," and applicable DOT requirements. For the transfer of unpackaged bulk material having external contamination, that contamination shall be fixed, covered, or contained sufficiently for safe transfer. (NVO-325 (Rev.1), Section 5.5.1.3.K)

Compliance Method: Not applicable.

d. Additional Criteria for Mixed Waste: In addition to meeting all of the LLW WAC, mixed waste offered for disposal at the Area 5 RWMS Mixed Waste Management Unit (MWMU) must meet the criteria described below. (NVO-325 (Rev.1), Section 5.5.2)

Compliance Method: Not applicable.

e. Additional Criteria For Transuranic/Transuranic Mixed Waste: Requests for storage of all TRU waste will be considered on a case-by-case basis only. (NVO-325 (Rev.1), Section 5.5.3)

Compliance Method: Not applicable.

f. Additional Criteria For Bulk Waste: Bulk waste is waste that is disposed of in Area 3. It generally exists in a form not suited to the conventional packaging requirements of Area 5. In addition to meeting the LLW WAC, bulk LLW must meet the requirements of Title 49 CFR 173.425(c). NTS-generated bulk waste must be transported in accordance with NV 54XG.1A and applicable DOT requirements. Bulk containers must be approved by DOE/NV. (NVO-325 (Rev.1), Section 5.5.4)

Compliance Method: Not applicable.

g. Additional Criteria for Case-by-Case Waste: In addition to meeting LLW WAC, the following case-by-case waste types offered for disposal at the NTS must meet the criteria described below. (NVO-325 (Rev.1), Section 5.5.5).

(1) Weight: (NVO-325 (Rev.1), Section 5.5.5.1)

Compliance Method: Not applicable.

(2) Activity Limits: (NVO-325 (Rev.1), Section 5.5.5.2)

Compliance Method: Not applicable.

(3) Radioactively Contaminated Asbestos: (NVO-325 (Rev.1), Section 5.5.5.3)

Compliance Method: Not applicable.

AD. Encapsulated Uranium Turnings

(4) *DOE Comparable Greater than Class C: (NVO-325 (Rev.1), Section 5.5.5.4)*

Compliance Method: Not applicable.

(5) *Classified Waste Streams: (NVO-325 (Rev.1), Section 5.5.5.5)*

Compliance Method: Not applicable.

(6) *Radioactive Animal Carcasses: (NVO-325 (Rev.1), Section 5.5.5.6)*

Compliance Method: Not applicable.

(7) *Other Waste Forms: (NV0-325 (Rev.1), Section 5.5.5.7)*

Compliance Method: Not applicable.

AD. Encapsulated Uranium Turnings

6. Waste Stream Characterization Data Sheet: (NVO-325 (Rev.1), Section 5.6)

WASTE STREAM CHARACTERIZATION DATA SHEET

1. Waste Stream No: BCLA-HWMEU0006

2. Waste Description: Depleted uranium machine turnings and grinding swarf encapsulated in Portland cement. Small quantities of natural uranium and natural thorium may be present.

   a. Physical Characteristics. Monolithic concrete cylinder.

   b. Special Handling/Disposal Requirements. None required.

3. Basis for Characterization:

   a. Process Knowledge:

   b. Analytical Knowledge:

   c. Both: X (If B or C, provide Standardized Data Reporting Forms as necessary)

4. Radioactive Characteristics:

   a. Is Waste > NRC Class C (See Title 10 CFR 61.55) ? NO

   b. WMIS Nuclide Category (circle): 1 ② 3 4 5 NA 7 (Choose the highest predominant nuclide. The number 6 is not an option)

   c. Radioactive Constituents: LLW from this waste stream is primarily depleted uranium with a slight potential for added contamination with trace quantities of natural uranium and natural thorium.

Specific Activity Range

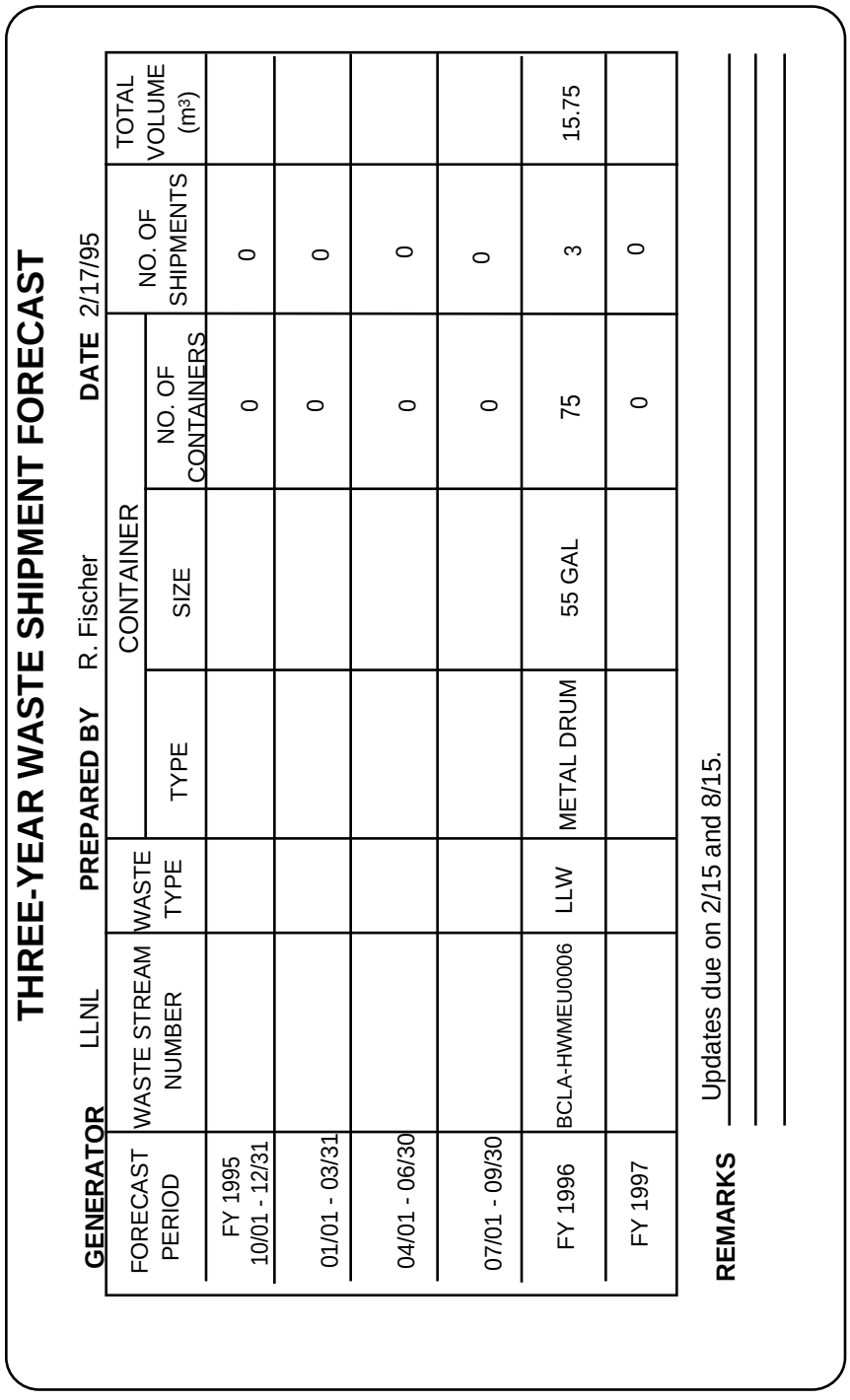
	Nuclide	Low	Mean	High
(1)	U-234	0	2.755×10^{-6} Ci/kg	2.755×10^{-4} Ci/kg
(2)	U-235	0	1.250×10^{-7} Ci/kg	1.250×10^{-5} Ci/kg
(3)	U-238	0	2.694×10^{-6} Ci/kg	2.694×10^{-4} Ci/kg
(4)	Th-232	0	8.840×10^{-7} Ci/kg	8.840×10^{-5} Ci/kg

5. Hazardous Components (for mixed waste): NONE

Figure 92. Waste Stream Characterization Data Sheet BCLA-HWMEU0006

AD. Encapsulated Uranium Turnings

7. Waste Forecasting: (Three-Year Waste Shipment Forecast) (NVO- 325 (Rev.1), Section 5.7).



THREE-YEAR WASTE SHIPMENT FORECAST

GENERATOR LLNL **PREPARED BY** R. Fischer **DATE** 2/17/95

FORECAST PERIOD	WASTE STREAM NUMBER	WASTE TYPE	CONTAINER TYPE	CONTAINER SIZE	CONTAINER NO. OF CONTAINERS	NO. OF SHIPMENTS	TOTAL VOLUME (m^3)
FY 1995 10/01 - 12/31					0	0	
01/01 - 03/31					0	0	
04/01 - 06/30					0	0	
07/01 - 09/30					0	0	
FY 1996	BCLA-HWMEU0006	LLW	METAL DRUM	55 GAL	75	3	15.75
FY 1997					0	0	

REMARKS Updates due on 2/15 and 8/15.

An update of this forecast is due every six months on 2/15 and 8/15.

Figure 93. Three-Year Waste Shipment Forecast-BCLA-HWMEU0006

8. Packaging and Shipping Information: Include the DOT proper shipping name, hazard class, and hazard identification number. (NVO-325 (Rev. 1), Section 5.8)

   Compliance Method: LLW shipments will be classed as follows (Procedure HWM 304):

   - Department of Transportation Shipping Name - Uranium metal, pyrophoric

     Hazard Class - Radioactive Material

     Hazard Identification Number - UN 2979

   Or

   - Department of Transportation Shipping Name - Thorium metal, pyrophoric

     Hazard Class - Radioactive Material

     Hazard Identification Number - UN 2975

   Or

   - Department of Transportation Shipping Name - Radioactive material, low specific activity, n.o.s. or Radioactive material, LSA, n.o.s.

     Hazard Class - Radioactive Material

     Hazard Identification Number - UN 2912

9. Waste Security Information: Provide information regarding any special security requirements. (NVO-325 (Rev.1), Section 5.9)

   Compliance Method: No security requirements are necessary for Waste Stream BCLA-HWMEU0006.

IV. WASTE CERTIFICATION PROGRAM

A. Waste Certification Plans:

LLNL Low-Level Waste (LLW) Program Certification and Quality Assurance Plan, M-078-95 (current revision)

SEG Project-Specific Quality Assurance Plan, QAP-127

LLNL Uranium Encapsulation Certification and QAP M-078-145 (current revision)

B. Certification-Related Procedures
Supporting procedures essential to the program are as follows:

WCP-14
WCP-15

V. EXEMPTION REQUEST

None

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